

Date: Mon, 7 Feb 94 04:30:33 PST  
From: Ham-Space Mailing List and Newsgroup <ham-space@ucsd.edu>  
Errors-To: Ham-Space-Errors@UCSD.Edu  
Reply-To: Ham-Space@UCSD.Edu  
Precedence: Bulk  
Subject: Ham-Space Digest V94 #21  
To: Ham-Space

Ham-Space Digest                      Mon, 7 Feb 94                      Volume 94 : Issue    21

Today's Topics:

    \* SpaceNews 31-Jan-94 \*  
    Anik Satellite Troubles  
        ANS Bulletin 036.01  
        ANS Bulletin 036.02  
        ANS Bulletin 036.03  
        ANS Bulletin 036.04  
        ANS Bulletin 036.05  
        ANS Bulletin 036.06  
    Daily IPS Report - 3 Feb 94  
        STS-60 / SAREX Freqs?  
    STS-60 Orbital Elements????  
        STS-60 SAREX QSL lists  
    STS-60 Shuttle Ground Communications Retransmissions

Send Replies or notes for publication to: <Ham-Space@UCSD.Edu>  
Send subscription requests to: <Ham-Space-REQUEST@UCSD.Edu>  
Problems you can't solve otherwise to brian@ucsd.edu.

Archives of past issues of the Ham-Space Digest are available  
(by FTP only) from UCSD.Edu in directory "mailarchives/ham-space".

We trust that readers are intelligent enough to realize that all text  
herein consists of personal comments and does not represent the official  
policies or positions of any party. Your mileage may vary. So there.

-----  
Date: Wed, 2 Feb 94 23:22:25 -0500  
From: noc.near.net!news.delphi.com!usenet@uunet.uu.net  
Subject: \* SpaceNews 31-Jan-94 \*  
To: ham-space@ucsd.edu

Is it just me or does it seem that the 1/31/94 issue of spacenews was cut  
short???

If anyone could post the full text of the issue I would appreciate it!!

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Date: Thu, 3 Feb 1994 04:22:33 GMT  
From: mvb.saic.com!unogate!news.service.uci.edu!usc!howland.reston.ans.net!  
cs.utexas.edu!utnut!nott!cunews!freenet.carleton.ca!FreeNet.Carleton.CA!  
ao601@network.ucsd.edu  
Subject: Anik Satellite Troubles  
To: ham-space@ucsd.edu

Latest news on the Anik sat. from Ottawa local news is that the problem has been narrowed down to the bird rotating about it's n/s axis once every 2 minutes. The good folks at telsat report that they believe it's possible to stop the motion and keep the ant. pointed at earth by ground controlled firing of the onboard hydrazine rockets. In the event this works it will allow a return to revenue service in about 6 months. I understand this is a massive software task and the knowledge gained is expected to generate a large cash-flow in the future in the event of a similar failure of someone else's bird. The down side of this is that the life expectancy of this relatively new satellite has just gone from 9 to 6 years. On the bright side the Canadian amateur radio country wide uhf link "I.P.A.R.N." has had it's anik channel moved to Anik-2 in only 5 working days, a fine job and many thanks from the Canadian hams.

Hope this is news  
Rick

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Date: Sat, 5 Feb 1994 22:55:49 -0700  
From: agate!howland.reston.ans.net!wupost!gumby!destroyer!nntp.cs.ubc.ca!alberta!  
ve6mgs!usenet@network.ucsd.edu  
Subject: ANS Bulletin 036.01  
To: ham-space@ucsd.edu

SB SAT @ AMSAT \$ANS-036.01  
STS-60 SAREX Mission Begins

HR AMSAT NEWS SERVICE BULLETIN 036.01 FROM AMSAT HQ  
SILVER SPRING, MD FEBRUARY 6, 1994  
TO ALL RADIO AMATEURS BT  
BID: \$ANS-036.01

STS-60 News as of 3 February 1994 at 12:30 UTC

The Space Shuttle Discovery made a spectacular, historic, on-time liftoff this morning from the Kennedy Space Center. Discovery's launch marks the first joint U.S.-Russian Space Shuttle Flight. This will be the first of several joint missions planned in preparation for the development of the international Space Station. Cosmonaut Sergei Krikalev, U5MIR, was one

of the six crew members on board this morning's Shuttle flight. His fellow American crew mates include Commander Charlie Bolden, KE4IQB, Pilot Ken Reightler, and Mission Specialists Jan Davis, Ron Sega, KC5ETH, and Franklin Chang-Diaz. The primary payloads on-board Discovery are the Wake Shield Facility, which will be deployed and retrieved during the flight and the Spacehab facility. Of particular interest to radio amateurs is the Shuttle Amateur Radio Experiment (SAREX) secondary payload. SAREX information for STS-60 including frequencies, callsigns and Keplerian elements, follows:

STS-60 Shuttle Amateur Radio Experiment (SAREX)  
Information Sheet

Mission: STS-60 Space Shuttle Discovery  
Wake Shield Facility & Spacehab-2 Mission

Launch: February 3, 1994, 12:10 UTC

Orbit: 57 degree inclination

Mission Length: 8 days (Nominal)

Amateur  
Radio

Operators: Charlie Bolden, KE4IQB, Ron Sega, KC5ETH,  
Sergei Krikalev, U5MIR

Modes: FM Voice  
Prime callsign: KE4IQB

Packet Radio  
Callsign: W5RRR-1

Frequencies: All operations in split mode. Do not transmit on  
the downlink frequency.

Voice Freqs: Downlink: 145.55 MHz (Worldwide)  
Uplinks: 144.91, 144.93, 144.95, 144.97, 144.99 MHz  
(Except Europe)  
144.70, 144.75, 144.80 MHz (Europe only)

Note: the crew will not favor any specific uplink  
frequency, so your ability to work the crew will  
be the "luck of the draw"

Packet Freqs: Downlink: 145.55 MHz  
Uplink: 144.49 MHz

Info: Goddard Amateur Radio Club, WA3NAN, Greenbelt Maryland,  
SAREX Bulletins and Shuttle Retransmissions  
3860 KHz, 7185 KHz, 14,295 KHz, 21,395 KHz, 28,650 KHz  
and 147.45 MHz (FM)

Johnson Space Center ARC, W5RRR, Houston, Texas  
SAREX Bulletins  
7225 KHz, 14,280 KHz, 21,395 KHz, 28,650 KHz, (SSB)  
and 146.64 MHz (FM)

ARRL Amateur Radio Station, W1AW, Newington, CT  
SAREX News Bulletins  
3990, 7290, 14,290, 18,160, 21,390, and 28,590 KHz  
and 147.555 MHz (FM)

Also, bulletins available on internet, via AMSAT ANS,  
Compuserve, and your local PBSS.

School Group Participation: 5 school groups will participate  
in SAREX with pre-scheduled direct  
and telebridge contacts. These include  
4 in the U.S., and one in Russia.

ANS wishes to thank Frank Bauer KA3HDO AMSAT VP for Manned Space Programs for  
this information.

/EX

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Date: Sat, 5 Feb 1994 22:55:34 -0700  
From: agate!howland.reston.ans.net!wupost!gumby!destroyer!nntp.cs.ubc.ca!alberta!  
ve6mgs!usenet@network.ucsd.edu  
Subject: ANS Bulletin 036.02  
To: ham-space@ucsd.edu

SB SAT @ AMSAT \$ANS-036.02  
SAREX UPDATE AS OF FEB 6 at 00:30 UTC

HR AMSAT NEWS SERVICE BULLETIN 036.02 FROM AMSAT HQ  
SILVER SPRING, MD FEBRUARY 6, 1994  
TO ALL RADIO AMATEURS BT  
BID: \$ANS-036.02

SAREX Begins Operation

SAREX was officially activated at 14:27 UTC on February 4 with a successful voice contact through the University of Surrey amateur radio station. Doug Loughmiller, G0SYX was the operator at the microphone to initiate the first contact with the STS-60 crew.

The SAREX team reports a highly successful direct contact one orbit later with a school group in Boise Idaho. The contact, held at the Discovery Center included students from several schools including the Boise Senior High School. 19 students were able to ask direct questions to Shuttle Commander Charlie Bolden.

The packet robot has also been quite active. The packet QSO sequence number exceeded the 800 mark about 30 hours after SAREX operations was initiated.

Problems with RFI on the Wake Shield Facility have delayed the deployment of this primary payload. This has affected the SAREX payload somewhat. Currently, the Mars, Pennsylvania school contact, which was scheduled for today, has been postponed until the Wake Shield issues have been resolved.

The official SAREX element set for today will be GSFC-003. Gil Carman, WA5NOM reports that the predictions using GSFC-003 are 1 second later than the current orbiter state vector.

```
1 22977U 94006A   94 35.13981770 0.00000202  00000-0  58718-5 0    37
2 22977  56.9857 213.2731 0008535 263.0773  96.9324 15.72145611  115
```

Satellite: STS-60

Catalog number: 22977

Epoch time: 94035.13981770 (04 FEB 94 03:21:20.25 UTC)

Element set: GSFC-003

Inclination: 56.9857 deg

RA of node: 213.2731 deg Space Shuttle Flight STS-60

Eccentricity: 0.0008535 Keplerian Elements

Arg of perigee: 263.0773 deg

Mean anomaly: 96.9324 deg

Mean motion: 15.72145611 rev/day Semi-major Axis: 6730.8981 Km

Decay rate: 0.20E-05 rev/day\*2 Apogee Alt: 358.25 Km

Epoch rev: 11 Perigee Alt: 346.77 Km

NOTE - This element set is based on NORAD element set # 003.

The spacecraft has been propagated to the next ascending node, and the orbit number has been adjusted to bring it into agreement with the NASA numbering convention.

ANS thanks Frank H. Bauer, KA3HD0, of the SAREX Working Group for this item.

/EX

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Date: Sat, 5 Feb 1994 22:55:22 -0700  
From: agate!howland.reston.ans.net!math.ohio-state.edu!cyber2.cyberstore.ca!  
nnntp.cs.ubc.ca!alberta!ve6mgs!usenet@network.ucsd.edu  
Subject: ANS Bulletin 036.03  
To: ham-space@ucsd.edu

SB SAT @ AMSAT \$ANS-036.03  
AMSAT NET ON GALAXY 3

HR AMSAT NEWS SERVICE BULLETIN 036.03 FROM AMSAT HQ  
SILVER SPRING, MD FEBRUARY 6, 1994  
TO ALL RADIO AMATEURS BT  
BID: \$ANS-036.03

AMSAT NET ON GALAXY 3

Satellite users may be interested in an experiment being conducted in the Houston, Texas area. The group there is uplinking the Houston Area Amsat Net, heard locally on the 147.10 FM repeater, to Galaxy 3, Channel 17, 5.8 Mhz. audio subcarrier (Shop-At-Home Channel). This net is carried in realtime on Tuesday evening, from approximately 10PM (CST) until completion at approximately 10:30 - 10:45 PM. This is an experiment but could be continued on a regular basis if interest is sufficient. Please send reports of your reception and your comments to: davidsonc@tcd.jsc.nasa.gov via Internet, or call (713) 483-0078 during business hours, or during the uplink period (713) 595-2393. Ask for Craig Davidson, WD5BDX.

ANS wishes to thank Craig Davidson WD5BDX for this information.

/EX

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Date: Sat, 5 Feb 1994 22:55:17 -0700  
From: agate!howland.reston.ans.net!wupost!gumby!destroyer!nnntp.cs.ubc.ca!alberta!  
ve6mgs!usenet@network.ucsd.edu  
Subject: ANS Bulletin 036.04  
To: ham-space@ucsd.edu

SB SAT @ AMSAT \$ANS-036.04

OSCAR-21 CELEBRATES THIRD BIRTHDAY

HR AMSAT NEWS SERVICE BULLETIN 036.04 FROM AMSAT HQ  
SILVER SPRING, MD FEBRUARY 6, 1994  
TO ALL RADIO AMATEURS BT  
BID: \$ANS-036.04

OSCAR-21 CELEBRATES THIRD BIRTHDAY

On 29 January 1991 the first international Orbiting Satellite Carrying Amateur Radio (OSCAR) in which radio amateurs from the former Soviet Union (CIS) worked together with radio amateurs from Germany was successfully launched.

The official name of the project was RM1, which stands for "RADIO M-1". The digital transponder RUDAK-2 is part of RM1.

After the launch from the Northern Cosmodrome in Plesetsk, Russia the satellite was named as AMSAT-OSCAR 21, to emphasize that the spacecraft was built by, and for, Radio Amateurs around the world.

AMSAT OSCAR-21 is an attached secondary payload (Piggy-back) aboard the CIS geological research satellite "INFORMATOR-1".

OSCAR-21 (also known as RS-14) is a joint project between AMSAT-U in Russia and AMSAT-DL in Germany.

Two UUENCODED files which show the RUDAK hardware and two pictures taken from an original launch video have been uploaded to AMSAT-BB by DB20S. The picture is compressed using CJPEG.

ANS thanks Peter Guelzow DB20S for this item.

/EX

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Date: Sat, 5 Feb 1994 22:55:10 -0700  
From: agate!howland.reston.ans.net!wupost!gumby!destroyer!nntp.cs.ubc.ca!alberta!ve6mgs!usenet@network.ucsd.edu  
Subject: ANS Bulletin 036.05  
To: ham-space@ucsd.edu

SB SAT @ AMSAT \$ANS-036.05  
AO-13 ZRO TEST SCHEDULES!

HR AMSAT NEWS SERVICE BULLETIN 036.05 FROM AMSAT HQ  
SILVER SPRING, MD FEBRUARY 6, 1994

TO ALL RADIO AMATEURS BT  
BID: \$ANS-036.05

A0-13 ZRO Tests Begin For '94

AMSAT-OSCAR-13

ZRO TEST SCHEDULE

FEBRUARY-MARCH 1994

The ZRO Memorial Technical Achievement Award Program, or just "ZRO Test" has a new schedule for February and March, 1994, via AMSAT-OSCAR-13. This activity is a test of operating skill and equipment performance.

During a typical ZRO run, a control station will send numeric code groups using CW at 10 words-per-minute. At the beginning of the run, uplink power from the control station is set to match the general beacon downlink strength. This is level "zero". The control operator will send and repeat a random five-digit number, then lower his uplink power by 3 dB (half power) and repeat the procedure with a new random number (level "1"). This will continue to a level 30 dB below the beacon (level "A").

A participating listener monitors the downlink signals until he or she can no longer copy the numbers. Those who can hear the beacon will qualify for the basic award by copying the code group heard at level "zero". The challenge is to improve home-station performance to a point where the lower-level downlink signals can be copied (levels 6 through A). To date, only one station, Darrel Emerson (AA7FV), has successfully copied level "A".

The following schedule of Mode "B" tests were chosen for convenient operating times and favorable squint angles. The tests can be heard on 145.840 MHz. Andy WA5ZIB will conduct all the tests. Mode "JL" tests will no longer occur due to the failure of A0-13's 70-cm transmitter.

Day	Date (UTC)	Time	Areas covered
Saturday	Feb. 12, 1994	2345 UTC	NA, SA, Europe, W. Africa
Sunday	Feb. 20, 1994	0330 UTC	NA, NW SA, Japan, Pacific
Saturday	Feb. 26, 1994	1930 UTC	NA, SA, Europe, Africa, ME
Saturday	Mar. 19, 1994	1930 UTC	NA, SA, Europe, Africa
Saturday	Mar. 26, 1994	2315 UTC	NA, SA

Note that the dates and days are shown in "UTC", thus the second



test occurs at 9:30 PM CST Saturday night (the 19th). Any changes will be announced as soon as possible via the AMSAT HF and AO-13 Operations Nets.

All listener reports with date of test and numbers copied should be sent to Andy MacAllister WA5ZIB, AMSAT V.P. User Operations, 14714 Knights Way Drive, Houston, TX 77083-5640. A report will be returned verifying the level of accurate reception. An S.A.S.E. is appreciated but not required.

Information about the AMSAT Awards Program can be found on page 197 of the "Proceedings of the AMSAT-NA Tenth Space Symposium" (1992). This paper, covering all the AMSAT-NA awards including specifics on the ZRO Test, was reprinted on page 10 in the March/April 1993 issue of "The AMSAT Journal". The ZRO Test information provided in the article covers test procedures, means for obtaining certificates and gives some historical background about the program. Reprints of the article can be obtained for an S.A.S.E. to WA5ZIB at the address above.

/EX

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Date: Sat, 5 Feb 1994 22:54:56 -0700  
From: agate!howland.reston.ans.net!wupost!gumby!destroyer!nntp.cs.ubc.ca!alberta!ve6mgs!usenet@network.ucsd.edu  
Subject: ANS Bulletin 036.06  
To: ham-space@ucsd.edu

SB SAT @ AMSAT \$ANS-036.06  
WEEKLY OSCAR STATUS REPORTS

HR AMSAT NEWS SERVICE BULLETIN 036.06 FROM AMSAT HQ  
SILVER SPRING, MD FEBRUARY 6, 1994  
TO ALL RADIO AMATEURS BT  
BID: \$ANS-036.06

Weekly OSCAR Status Reports: 6 FEB-94

AO-13: Current Transponder Operating Schedule:  
L QST \*\*\* AO-13 TRANSPONDER SCHEDULE \*\*\* 1994 Jan 31-Apr 04  
Mode-B : MA 0 to MA 90 |  
Mode-BS : MA 90 to MA 120 |  
Mode-S : MA 120 to MA 145 |<- S transponder; B trsp. is OFF  
Mode-S : MA 145 to MA 150 |<- S beacon only  
Mode-BS : MA 150 to MA 180 | Blon/Blat 180/0  
Mode-B : MA 180 to MA 256 |  
Omnis : MA 230 to MA 30 | Move to attitude 240/0, Apr 04

Poor Sun angle and battery testing need maximum OFF time.  
[G3RUH/DB20S/VK5AGR]

F0-20: The following is the current F0-20 operating schedule:  
From January '94 thru March '94, the analog mode and the  
digital mode will be on alternately for a week at a time.  
ANALOG MODE:

09-FEB-94 7:15 -TO- 16-FEB-94 7:40 UTC  
23-FEB-94 8:05 -TO- 02-MAR-94 6:40 UTC  
09-MAR-94 7:05 -TO- 16-MAR-94 7:30 UTC  
23-MAR-94 7:52 -TO- 30-MAR-94 8:15 UTC

DIGITAL MODE: Unless otherwise noted above.  
[Kazu Sakamoto (JJ1WTK) qga02014@niftyserve.or.jp]

A0-21: ZL3VTV works A0-21 with great success from his QTH in Christchurch, New Zealand. He regularly works stations in Australia with ease using a fixed 10 element beam pointed 30 deg above the horizon on the uplink and using a collinear antenna for the downlink. ZL3VTV is looking for to work more ZL's and would entertain schedules. [ZL3VTV @ZL3AC]

The AMSAT NEWS Service (ANS) is looking for volunteers to contribute weekly OSCAR status reports. If you have a favorite OSCAR which you work on a regular basis and would like to contribute to this bulletin, please send your observations to WD0HHU at his CompuServe address of 70524,2272, on INTERNET at wd0hhu@amsat.org, or to his local packet BBS in the Denver, CO area, WD0HHU @ W0LJF.#NECO.CO.USA.NOAM. Also, if you find that the current set of orbital elements are not generating the correct AOS/LOS times at your QTH, PLEASE INCLUDE THAT INFORMATION AS WELL. The information you provide will be of value to all OSCAR enthusiasts.

/EX

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Date: 3 Feb 94 00:38:29 GMT  
From: usc!elroy.jpl.nasa.gov!sdd.hp.com!spool.mu.edu!cass.ma02.bull.com!  
syd.bull.oz.au!brahman!tmx!news.cs.su.oz.au!metro!news.ci.com.au!eram!  
dave@network.ucsd.edu  
Subject: Daily IPS Report - 3 Feb 94  
To: ham-space@ucsd.edu

IPS RADIO AND SPACE SERVICES AUSTRALIA  
Daily Solar And Geophysical Report  
Issued at 2330 UT 2 February 1994  
Summary for 2 February and Forecast up to 5 February  
No warning is current.  
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#### 1A. SOLAR SUMMARY

Activity: very low

Flares: none

Observed 10.7 cm flux/Equivalent Sunspot Number : 96/44

#### 1B. SOLAR FORECAST

	03 February	04 February	05 February
Activity	Very low	Very low	Very low
Fadeouts	None expected	None expected	None expected

Forecast 10.7 cm flux/Equivalent Sunspot Number : 100/49

#### 1C. SOLAR COMMENT

None.

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#### 2A. MAGNETIC SUMMARY

Geomagnetic field at Learmonth : quiet to unsettled

Estimated Indices :	A	K	Observed A Index 1 February
Learmonth	14	2234 4331	
Fredericksburg	14		06
Planetary	15		06

#### 2B. MAGNETIC FORECAST

DATE	Ap	CONDITIONS
03 Feb	07	Quiet.
04 Feb	07	Quiet.
05 Feb	07	Quiet.

#### 2C. MAGNETIC COMMENT

None.

#### 3A. GLOBAL HF PROPAGATION SUMMARY

	LATITUDE BAND		
DATE	LOW	MIDDLE	HIGH
02 Feb	normal	normal	normal

PCA Event : None.

#### 3B. GLOBAL HF PROPAGATION FORECAST

	LATITUDE BAND		
DATE	LOW	MIDDLE	HIGH
03 Feb	normal	normal	normal
04 Feb	normal	normal	normal
05 Feb	normal	normal	normal

3C. GLOBAL HF PROPAGATION COMMENT  
NONE.

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4A. AUSTRALIAN REGION IONOSPHERIC SUMMARY  
MUFs at Sydney were 15 to 30% above predicted monthly values

T index: 76

4B. AUSTRALIAN REGION IONOSPHERIC FORECAST

DATE	T-index	MUFs
03 Feb	60	About 15% above predicted monthly values.
04 Feb	60	About 10% above predicted monthly values.
05 Feb	50	About 10% above predicted monthly values.

Predicted Monthly T Index for February is 30.

4C. AUSTRALIAN REGION COMMENT

None.

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Dave Horsfall (VK2KFU)	VK2KFU @ VK20P.NSW.AUS.OC	PGP 2.3
dave@esi.COM.AU	...munari!esi.COM.AU!dave	available

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Date: Fri, 4 Feb 94 17:08:55 GMT  
From: ucsnews!newshub.sdsu.edu!usc!howland.reston.ans.net!europa.eng.gtefsd.com!  
news.umbc.edu!eff!news.kei.com!ub!galileo.cc.rochester.edu!news@network.ucsd.edu  
Subject: STS-60 / SAREX Freqs?  
To: ham-space@ucsd.edu

Could someone please post the SAREX Freqs? Is it on 145.55? Somewhere else?  
Are the packet Freqs the same as the Voice? Are they even DOING packet?

-Bill VanRemmen  
billy@urhep.pas.rochester.edu  
URHEP::billy

My opinions. No one else's. Definitely not the U of R's.

=====  
"Experience should teach us to be most on our guard to protect liberty  
when the government's purposes are beneficent . . . the greatest  
dangers to liberty lurk in insidious encroachment by men of zeal, well  
meaning but without understanding."

Justice Louis Brandeis

Olmstead vs. United States, United States Supreme Court, 1928  
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Date: Fri, 4 Feb 1994 21:44:50 GMT  
From: telesoft!garym@uunet.uu.net  
Subject: STS-60 Orbital Elements????  
To: ham-space@ucsd.edu

In <2iritj\$rkbb@hp-col.col.hp.com> jsb@col.hp.com (Jeff Beauprez) writes:  
>The subject says it all. Any one have them at this point?

I post them to rec.radio.amateur.space, rec.radio.info and sci.space.news.  
The first post-launch set were posted Thursday.

If you regularly need Shuttle elements there is also a mailing list just for  
distributing shuttle elements. For a subscription write to  
elements-request@alsys.com.

--GaryM

--

Gary Morris KK6YB  
San Diego, CA USA

Internet: garym@alsys.com  
Phone: +1 619-457-2700 x128 (work)

-----  
Date: 6 Feb 1994 18:42:07 GMT  
From: dog.ee.lbl.gov!agate!usenet@network.ucsd.edu  
Subject: STS-60 SAREX QSL lists  
To: ham-space@ucsd.edu

Here are two sets of STS-60 SAREX QSL lists (times are UTC) as recorded in  
the San Francisco Bay Area (the first set by KC6ROL, the second by DL5KR):

Orbit 34:

W5RRR-1>QSL [02/05/93 14:39:21] <UI>:  
G0SYX/812 G3RWL/810 VE3AA/809 VE3TIR/808 KB8KPV/805 W7US/802 KB2MVN/800  
VE3BDR/796 KG3N/795 N2NRD/794 W2RS/792 VK3ACC/778 VK5AGR/777 VK6ZLK/773  
OH9MMN/763

Orbit 50:

W5RRR-1>QSL [02/06/93 15:05:17] <UI>:  
WB6FJE/1494 OZ8QI/1481 N9JGQ/1443 KD8SI/1439 K5VAS/1423 W5IU/1419 OE3CV/1382  
SM4EFW/1374 OE8PCK/1362 KD4HSL/1296 WP4LBK/1287 LA9QN/1241 VK3YIC/1221  
VK2ZW/1217 VK4CHB/1202

Hope you find your call sign in it. Did anyone record a QSL message with

numbers in the high 900's (say around #976)?

Best 73,  
Manfred --- W6/DL5KR

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Date: 3 Feb 1994 13:12 EDT  
From: mustang.mst6.lanl.gov!nntp-server.caltech.edu!elroy.jpl.nasa.gov!usc!  
howland.reston.ans.net!paladin.american.edu!zombie.ncsc.mil!cs.umd.edu!  
news.gsfc.nasa.gov!nssdca.gsfc.@nntp.ucsb.edu  
Subject: STS-60 Shuttle Ground Communications Retransmissions  
To: ham-space@ucsd.edu

#### INTERESTED IN THE CURRENT SHUTTLE MISSION

The current mission has a number of interesting aspects: this first Russian astronaut to fly on a shuttle, the 100th GSFC managed Get Away Special payload, as well as planned Shuttle Amateur Radio Experiment activities.

The Goddard Amateur Radio Club (GARC) WA3NAN invites you to tune into Shuttle transmissions. As a public service to the Amateur radio community, the GARC retransmits space shuttle air-to-ground communications. During the STS-60 mission, Amateur radio operators, shortwave listeners, and those individuals with scanners can listen to these communications on the following frequencies:

3.860 MHz (lower sideband)  
7.185 MHz (lower sideband)  
14.295 MHz (upper sideband)  
21.395 Mhz (upper sideband)  
28.650 Mhz (upper sideband)

and

147.45 Mhz (FM)

Erich, N3OXM  
GARC PI Coordinator

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End of Ham-Space Digest V94 #21  
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